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ABSTRACT

The purpose of this study is 1) to describe tobacco cessation services offered by American secondary schools, and 2) to examine the relationship between cessation services and adolescent smokers; frequency of cigarette use. Self-administered questionnaires were completed in 2001 and 2002 by national samples of 8th, 10th, and 12th grade students and their school administrators. Hierarchical linear modeling was used to determine the association between school cessation services and frequency of smoking. A majority of schools do not offer any cessation services at present. High school and larger schools were more likely than middle schools or smaller schools to offer at least one cessation service Among 8th grade smokers, frequency of cigarette use was significantly lower in schools with stronger cessation service contexts. Among 10th and 12th grade smokers, the relationship was not significant. School cessation services may have beneficial effects on adolescent smokers, particularly when addresses at an earlier grade level. (Contains 23 references and 3 tables.) (Author)

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Effects of School-Based Tobacco Cessation Services on Adolescent Tobacco Use: Results from a National Study

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Abstract

The purpose of this study is 1) to describe tobacco cessation services offered by American secondary schools, and 2) to examine the relationship between cessation services and adolescent smokers' frequency of cigarette use. Self-administered questionnaires were completed in 2001 and 2002 by national samples of 8th, 10th, and 12th grade students and their school administrators. Hierarchical linear modeling was used to examine the association between school cessation services and frequency of smoking. A majority of schools do not offer any cessation services at present. High schools and larger schools were more likely than middle schools or smaller schools to offer at least one cessation service. Among 8th grade smokers, frequency of cigarette use was significantly lower in schools with stronger cessation service contexts. Among 10th and 12th grade smokers, the relationship was not significant. School cessation services may have beneficial effects on adolescent smokers, particularly when addressed at an earlier grade level.

Effects of School-Based Tobacco Cessation Services on Adolescent Tobacco Use: Results from a National Study

Adolescence is a time of self-discovery, expression, and experimentation. Unfortunately, the experimental nature of adolescence provides a prime environment for exploring substance use. Considerable initiation of tobacco use occurs prior to grade 6, and substantial initiation occurs in grades 6 through 9 (DeWit, Offord, & Wong, 1997; Johnston, O'Malley, & Bachman, 2002a). Smoking rates among secondary school students sharply increased from the early 1990s to 1996 and 1997. While 30-day and daily prevalence rates have shown declines since then (Johnston et al., 2002a), rates are still unacceptably high. Thus, methods of cessation are needed to reduce future costs resulting from youthful tobacco use (Burt & Peterson, 1998; Ershler, Leventhal, Fleming, & Glynn, 1989; Lamkin, Davis, & Kamen, 1998; Stanton, Currie, Oei, & Silva, 1996).

In secondary schools, more attention has traditionally been given to specific cessation programs rather than cessation treatment services (Bonaguro & Bonaguro, 1989; Schubiner, Herrold, & Hurt, 1998; Wagner & Atkins, 2000). However, two of the major problems in cessation programs geared toward adolescents are recruitment and retention. In reviewing the literature on adolescent tobacco cessation, Moolchan and his associates (2000) found that smoking cessation programs and services are often unsuccessful in bringing about a continued decrease in tobacco use because of the difficulty in recruiting adolescents and retaining them in the programs. Through the use of focus groups, Sussman and his colleagues (1991) found a utility in self-generated strategies designed to recruit adolescent tobacco users into a high school based tobacco cessation clinic. Hence, these researchers advocate a youth-tailored approach to cessation, which may improve recruitment and retention issues.

Another major question concerns the effectiveness of cessation programs. Evaluations of adolescent tobacco cessation programs have not been entirely edifying and have been plagued with methodological problems, such as small sample sizes, high attrition rates, lack of longitudinal follow-up, and limited external validity (Lotecka & MacWhinney, 1983; Mills, Ewy, & Dizon, 1978; Prokhorov, Pallonen, Fava, Ding, & et al., 1996; St. Pierre, Shute, & Jaycox, 1983; Thompson, 1994). Further, evaluation studies have found only small or limited intervention effects (Severson, Glasgow, Wirt, Brozovsky, & et al., 1991). For example, Project PATH (Programs to Advance Teen Health) focuses on sensitizing students to covert/overt pressures to use tobacco and on training in methods for responding to such pressures, such as refusal skills and decision-making. While the program was not related to decreased cigarette use, it did decrease smokeless tobacco use among males in middle school (Severson et al., 1991).

An often-missed area of study in adolescent smoking cessation is the effect of school cessation treatment services. Specific cessation programs may not have significant effects on adolescent smoking or quitting behaviors due to their short-term, "add-on" course nature. However, schools that continually offer cessation treatment services, perhaps including a variety of service types, may yield stronger results. Thus, this study focuses on ongoing school cessation treatment services and its relationship with cigarette use among adolescent smokers.

Utilizing student-level data on students' smoking and school-level data on cessation services offered at the school, we address the following research questions:

1. What, if any, cessation services do schools offer to student smokers?
2. Are there differences in cessation services offered as a function of characteristics of the school?

3. Is there an association between the school cessation context and frequency of cigarette use by students?

Method

Sample

Data were obtained in 2001 and 2002 using self-administered questionnaires among *(a)* nationally representative samples of 8th, 10th, and 12th grade students participating in the Monitoring the Future (MTF) study sponsored by the National Institute on Drug Abuse (Johnston, O'Malley, & Bachman, 2002b) and *(b)* principals from the same MTF schools participating in a separate study sponsored by the Robert Wood Johnson Foundation, the Youth, Education, and Society (YES) project. The MTF sample is drawn separately for each of the three grades using a three-stage sampling procedure in which (1) geographic areas are selected, (2) schools are selected with probability proportionate to size, and (3) students are selected within each school. This three-stage sampling procedure has yielded some 424 schools participating each year, as do about 44,000 students (Johnston et al., 2002b).

For this study, we focused on 8th, 10th, and 12th grade students who described themselves as smoking "regularly now" and smoked any cigarettes in the past 30 days, which yielded 497 8th grade smokers in 85 schools, 992 10th grade smokers in 111 schools, and 1291 smokers in 103 schools.

Data Collection Procedures

Representatives of the University of Michigan Survey Research Center distribute and collect self-administered questionnaires from students usually in their normal classrooms. The questionnaires are anonymous (grades 8 and 10) or confidential (grade 12) and take

approximately one class period to complete. The average response rate for 8th, 10th, and 12th grade students are 90%, 88%, and 82%, respectively.

The school administrator data are collected by mail, usually from the school's principal, but sometimes from another administrator chosen by the principal. The self-administered questionnaire is long, but a relatively high respondent payment results in a high participation rate (82%).

Measures

Frequency of cigarette use. From the subset of 8th, 10th, and 12th grade students who described themselves as smoking "regularly now," cigarette use frequency over the past 30 days was assessed using a 6-point scale (1 = less than one cigarette per day, 2 = one to five cigarettes per day, 3 = about one-half pack per day, 4 = about one pack per day, 5 = about one and one-half pack per day, 6 = two packs or more per day). The frequency of cigarette use among current regular smokers was approximately symmetrically and normally distributed, with means (and standard deviations) 2.9 (1.3), 2.8 (1.1), and 2.9 (1.0) for 8th, 10th, and 12th graders respectively.

Cessation services in schools. School officials surveyed in the same school as the students were asked to indicate which (if any) of a list of tobacco cessation services were offered by the school to students. The types of services were: (a) group counseling/classes, (b) individual face-to-face counseling, (c) referrals to community programs/services, (d) peer buddy systems, (e) nicotine patches/gum, and (f) computer help program. The types of services were combined to create a four-point scale (0=No services offered, 1= One service offered, 2= Two services offered, 3= Three or more services offered). A binary variable, prevalence of any cessation services, was also created (0 = No services, 1 = At least one service).

School characteristics. Schools are characterized by their grade level (8th grade = middle school, 10th and 12th grade = high school), sector (public or private), population density (from census classification of large Metropolitan Statistical Area (MSA), other MSA, or non-MSA), number of students in the relevant grade (< 75 students = small school size, 75-225 = medium, > 225 = large), socioeconomic status (< 15% of students with free or reduced lunch programs = high SES, 15-39% = middle SES, > 39% = low SES), region of country(from census classification of Northeast, North Central, South, or West), and majority race/ethnicity (White [> 66% White students in the school], African American [> 50% African American students in the school], Hispanic [> 50% Hispanic students in the school], and all other race/ethnicity mixes).

Student characteristics. Race/ethnicity was categorized into African American, Hispanic, and other (Asian, Native American, other), with Caucasian serving as the referent group. For gender, the referent group was male. Grade point average was measured on a 9-point scale ("Which of the following best describes your average grade in this school year?" 1 = D, 2 = C-, 3 = C, 4 = C+, 5 = B-, 6 = B, 7 = B+, 8 = A-, 9 = A).

Analyses

Descriptive analyses were conducted to determine how many schools offered cessation services during 2000-2001 and 2001-2002 school years, and to explore differences in cessation prevalence by school characteristics. To determine whether school cessation services influence smoking rates of current regular smokers, hierarchical linear modeling was utilized to take into account the nestedness of the data. In the first model, cessation services as a level-2 predictor was modeled for frequency of cigarette use for 8th, 10th, and 12th grade current regular smokers separately. If cessation services had a significant relationship, a second model was estimated, controlling for student gender, race, and ability.

Results

Cessation Services in Schools

Table 1 shows the descriptive statistics of cessation services in secondary schools. During 2001 and 2002, the majority of schools did not offer cessation services; but 42.8% of schools (containing 43.2% of students) reported having at least one cessation service. Almost a quarter of the schools offer only one cessation service (22.8% of schools, containing 23.1% of students). Only 7.5% of schools, containing 7.4% of students, offered three or more cessation services in school.

Schools often provide group counseling (20.8% of schools containing 21.3% of students) or individual face-to-face counseling (31.2% of schools containing 30.7% of students). Very few schools offer computer help programs (0.9% of schools containing 0.5% of students) or nicotine patch/gum (2.0% of schools containing 1.9% of students).

Cessation Services by School Characteristics

Table 2 shows the descriptive statistics on cessation services by school characteristics. In 2001 and 2002, there were significant differences (bivariately) in school cessation service offerings by school grade level, school sector, and school size. For school grade level, more high schools (47.8% of schools containing 48.4% of students) provided any cessation services to their students than middle schools (30.7% of schools containing 32.3% of students). For school sector, public schools (45.9% of schools containing 44.5% of students) provided more cessation services than private schools (25.0% of schools containing 30.0% of students). Large and mid-sized schools provided more cessation services than small schools (49.5% of large schools containing 46.5% of students and 48.5% of mid-sized schools containing 48.7% of students, respectively,

compared to 30.1% of small schools (24.5% of students). In a multivariate analysis, the differences related to school level and school size remained significant.

Cessation Services and Cigarette Use among Adolescent Smokers

Table 3 provides information on the frequency of cigarette use among 8th, 10th, and 12th grade smokers by the number of school cessation services offered. The multilevel models for 8th grade smokers show a statistically significant negative relationship between student cigarette use and the availability of cessation services, particularly after controlling for student characteristics (β=-.154, se=.073, t=2.148). For 10th and 12th grade current regular smokers, there were no significant relationships between student cigarette use and the availability of cessation services in school.

Discussion

Despite the relatively high prevalence of tobacco use among secondary school students (Johnston et al., 2002b), the majority of schools in the sample offer no cessation services for students. These results corroborate the fact that schools are more likely to offer prevention programs, and not cessation or treatment services, as indicated by past studies (Bonaguro & Bonaguro, 1989; Schubiner et al., 1998; Wagner & Atkins, 2000). High schools and mid-sized to large schools are more likely to provide such services than middle schools and small schools.

Given that adolescents spend most of their time in school (Everett et al., 1999), schools remain a logical venue in which to provide them assistance in quitting smoking early. Cessation services were associated with decreased frequency of cigarette use among 8th grade current regular smokers. The relationship was not significant for 10th and 12th grade students. This may indicate the need to catch adolescent smokers early in their smoking career. By the time students reach high school, smoking cessation may be particularly difficult, regardless of services

provided in school, because of their longer smoking history (Botvin & Epstein, 1999) and peer influence.(Stanton et al., 1996)

School cessation services may have beneficial effects on students for a few reasons. First, rather than community-level services, of which relatively few students may be aware, school-level services provide more mass distribution because students spend most of their time in school. Second, when services are offered in a school context, students may be more likely to be surrounded by positive peer influences that help and reinforce cessation behaviors. Third, recent research suggests that school connectedness is associated with lower levels of student substance use (McNeely, Nonnemaker, & Blum, 2002). A school context that offers in-house cessation services may be an indicator that students feel connected to the school. Hence, unlike punitive or harsh policies, which are associated with decreasing student connectedness (McNeely et al., 2002), and which seem not to be effective deterrents to student smoking (Kumar, O'Malley, Johnston, Schulenberg, & Bachman, 2002), offering in-house cessation services may prove to increase student connectedness and thus decrease student cigarette use. Finally, unlike traditional cessation programs that have a finite end point, school cessation contexts continue to help, encourage, and teach students to quit throughout the school year. This ever-present school context that supports students in smoking cessation, such as the positive effects of booster sessions (Sussman, Hansen, Flay, & Botvin, 2001), may be key to successful long-term cessation.

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Table 1: Descriptive statistics on school cessation services

	2001 N= 177		2002 N= 169		Total N= 346	
	% Schools	% Students	% Schools	% Students	% Schools	% Students
No cessation services	58.4	55.7	56.0	57.8	57.2	56.8
Any cessation service	41.6	44.3	44.0	42.2	42.8	43.2
One cessation service	23.6	22.7	22.0	23.4	22.8	23.1
Two cessation services	10.7	11.4	14.3	14.0	12.4	12.8
Three or more cessation services	7.3	10.2	7.7	4.8	7.5	7.4
Specific Services						
Individual counseling	30.3	32.9	32.1	28.7	31.2	30.7
Group counseling	21.9	25.5	19.6	17.5	20.8	21.3
Referrals to community programs	12.4	16.2	17.9	16.1	15.0	16.1
Peer buddy	3.9	4.2	3.6	3.0	3.8	3.6
Nicotine patch/gum	1.7	2.2	2.4	1.6	2.0	1.9
Computer help programs	0	0	1.8	.9	.9	.5

Notes: Percentages are based on total sample for each year. Weights were used to estimate a nationally representative sample of students in schools.

Table 2: School characteristics and school cessation services

		Have any cessation services	
	N	% Schools	% Students
School Level			
Middle [a]	101	30.7	32.3
High +++, **	245	47.8	48.4
Sector			
Public [a]	294	45.9	44.5
Private +	52	25.0	30.0
Population Density			
Large MSA [a]	85	36.5	34.3
Other MSA	177	49.2	52.1
Non-MSA	84	35.7	28.4
School SES			
Low SES [a]	127	41.7	37.1
Mid-SES	118	46.6	51.2
High SES	101	39.6	41.3
School Size			
Smallest Third [a]	113	30.1	24.5
Middle Third ++, *	130	48.5	48.7
Largest Third ++, *	103	49.5	46.5
Majority Race/ethnicity			
> 66% White [a]	227	43.2	44.4
Majority Black	31	38.7	34.2
Majority Hispanic	28	42.9	47.1
Other	60	43.3	40.0
Region			
Northeast [a]	85	40.0	40.9
North Central	94	38.3	39.0
South	102	44.1	42.6
West	65	50.8	52.6

Note: [a] Referent Group. For bivariate logistic regression results, + $p < .05$, ++ $p < .01$, +++ $p < .001$. For multivariate logistic regression results, * $p < .05$, ** $p < .01$, *** $p < .001$. Weights were used to estimate a nationally representative sample of students in schools.

Table 3: Frequency of current smoking among current regular smokers by number of school cessation services: 2001-2002 combined.

	No Services			One Service			Two Services			Three (or more) Services			Model 1		Model 2	
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	β	se	β	se
8th grade 30-day frequency	2.9	1.4	273	3.0	1.2	120	2.8	1.1	66	2.6	1.1	38	-.116~	.067	-.154*	.073
10th grade 30-day frequency	2.8	1.2	446	2.8	1.2	322	2.9	1.0	120	2.8	1.1	104	.023	.045	--	--
12th grade 30-day frequency	2.9	1.1	589	3.1	1.1	252	2.9	.9	278	2.8	.9	172	-.014	.045	--	--

Notes: Sample includes regular current adolescent smokers. In 8th grade, there were 497 smokers in 85 schools; in 10th grade, there were 992 smokers in 111 schools; in 12th grade, there were 1291 smokers in 103 schools. For Model 2, student demographic information, gender, race, and school grade point average, was controlled. '—' denotes that Model 2 was not run due to insignificance in Model 1.

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